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ABSTRACT

Examples and exercises are provided in a sequential approach designed to familiarize the student with percents, fractions, and ratios. Key words used in the workbook are identified first, followed by exercises focusing on 14 learning objectives: (1) identifying the whole as 100%; (2) expressing a part of 100 as a ratio; (3) changing a fraction in hundredths to a percent and vice versa; (4) renaming a fraction to an equivalent fraction in hundredths; (5) determining the percent of a part of a figure; (6) writing a decimal as a percent and vice versa; (7) writing a ratio as part of the total; (8) solving for a variable in a proportion; (9) finding a percent of a number using a proportion; (10) finding a number when the part and the percent of the proportion are known (e.g., 15% of 12); (11) determining the percent one number is of another (e.g., what percent of 50 is 30); (12) solving word problems involving percents; (13) solving percent problems with percents greater than 100; and (14) solving percent problems with percents less than 1. Included in the workbook is a series of word problems designed as a post-test to be used in measuring student achievement. An answer key is provided. (JP)

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ED194170

PERSONAL ACHIEVEMENT

MATHEMATICS

Percent

Produced by

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Fund for the Improvement of Postsecondary Education

JC 800 609

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CURRICULUM MATERIALS DEVELOPED

UNDER THE AUSPICES OF

FUND TO IMPROVE POST SECONDARY EDUCATION

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MATHEMATICS

CURRICULUM DEVELOPER

1976

PERCENT

On satisfactory completion of this learning packet, you should be able to do correctly eight out of ten problems on a post-test covering the following objectives.

1. Identify the whole as 100%.
2. Express a part of 100 as a ratio.
3. Change a fraction in hundredths to a percent and vice versa.
4. Rename a fraction to an equivalent fraction in hundredths.
5. Determine the percent of a part of a figure.
6. Write a decimal as a percent and vice versa.
7. Write a ratio of a part to the total.
8. Solve for a variable part of a proportion.
9. Find a percent of a number using a proportion, e.g., 25% of 66 is what number?
10. Find a number when the part and percent of the proportion are known, e.g., 15% of what number is 12?
11. Find what percent one number is of another, e.g., what percent of 50 is 30?
12. Solve word problems involving percents.
13. Solve percent problems with percents greater than 100%.
14. Solve percent problems with percents less than 1%.

KEY WORDS

The key words used in this packet are listed below. If you do not understand the key words, look them up in the glossary before preceeding.

Percent

Fraction

Decimal

Ratio

Proportion

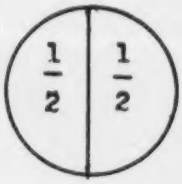
Cross multiplication

Equation

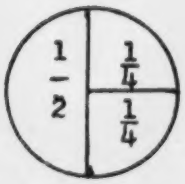
FRACTIONS MEAN PART OF A WHOLE

WHOLE

TOTAL

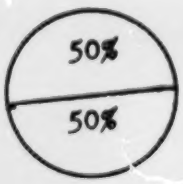


$\frac{1}{2} + \frac{1}{2} = 1$



$\frac{1}{2} + \frac{1}{4} + \frac{1}{4} = 1$

PERCENTS MEAN PART OF A TOTAL 100%



50% + 50% = 100%

50% + 25% + 25% = 100%

In the circle below 25% is shaded.

What percent is not shaded?

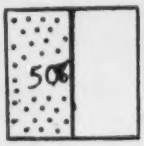
100% - 25% = 75%

In the square below 1/2 is shaded.

What percent is not shaded?

1/2 = 50%

100% - 50% = 50%



In each figure below what percent is not shaded?

1.

2.

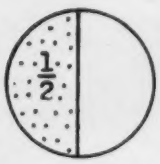
3.

4.

5.

6.

7..

8. 

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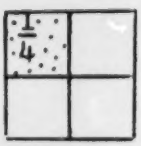
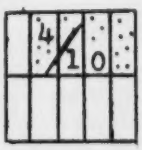
10. 

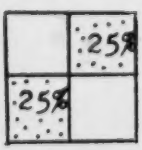
11. 

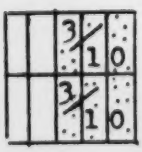
12.

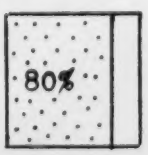
13.

14.

15.

16. 

17. 

18. 

$12\% + 88\% = 100\%$

$23\% + \ ? = 100\%$ $\qquad$ $41\% + \ ? = 100\%$

PROBLEM SOLVING:

About 54% of all the automobiles in the world are outside the United States. What percent of the automobiles are in the United States?

$100\% - 54\% = 46\%$

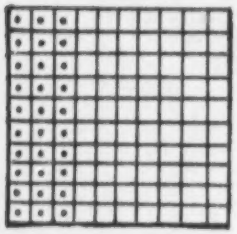
1. In one store 47% of all the slacks are on sale. What percent are <u>not</u> on sale?

2. In a shirt factory 10% of the shirts produced have some mistakes in the stiching. What percent do not have mistakes?

3. A store manager thought that 70% of the people who came in to his store bought something. What percent did not buy anything?

4. In one town 37% of the population are under the age of eighteen. What percent are over the age of eighteen?

5. In a new travel book 47% of the pages have pictures and 10% of the pages have maps. All the other pages are printed information. What percent of the pages are printed information?

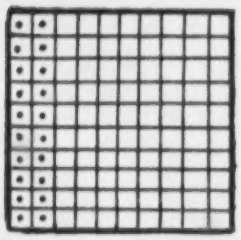


PERCENT IS THE PART OF 100

PERCENTS NAME SPECIAL RATIOS IN HUNDREDTHS

Ratio	Percent
$\frac{30}{100}$	30%

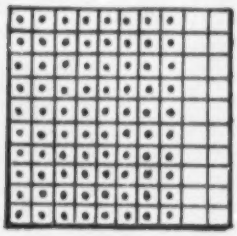
Example:



Ratio	Percent

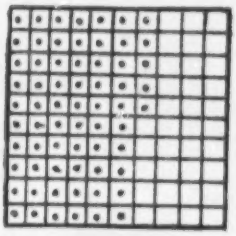
Complete:

1.



Ratio	Percent

2.



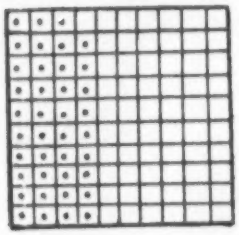
Ratio	Percent

WRITE A PERCENT FOR EACH OF THE RATIO BELOW:

3. $\frac{6}{100} = 6\%$
4. $\frac{37}{100}$
5. $\frac{17}{100}$
6. $\frac{57}{100}$
7. $\frac{78}{100}$
8. $\frac{9}{100}$
9. $\frac{50}{100}$
10. $\frac{12}{100}$
11. $\frac{96}{100}$
12. $\frac{42}{100}$
13. $\frac{23}{100}$
14. $\frac{69}{100}$

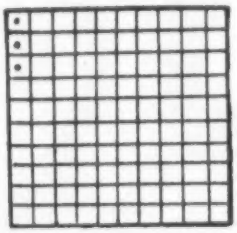
Write a fraction for the percent. Simplify if you can.

1.



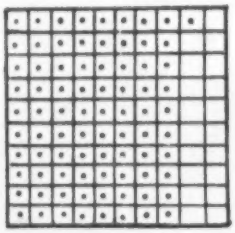
$39\% = \frac{39}{100}$

2.



$3\% =$

3.



$81\% =$

4. 16%

5. 12%

6. 99%

7. 38%

8. 47%

9. 76%

10. 7%

11. 20%

12. 3%

13. 66%

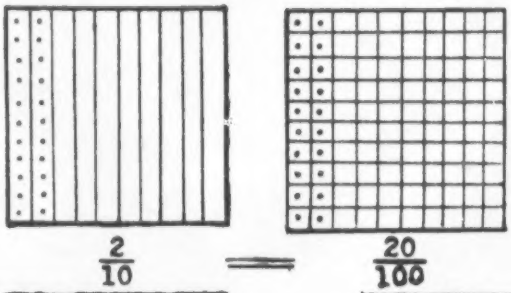
14. 85%

15. 1%

16. 81%

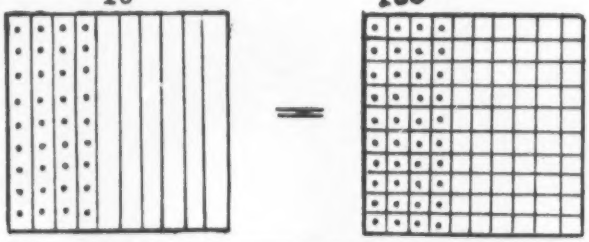
17. 40%

18. 50%

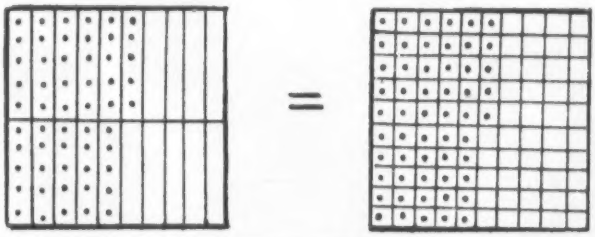


$\frac{2}{10}$ = $\frac{20}{100}$

Fraction	Hundredths	Percent
$\frac{2}{10}$	$\frac{20}{100}$	20 %



Fraction	Hundredths	Percent



Fraction	Hundredths	Percent

WRITE A PERCENT FOR EACH OF THE FRACTIONS:

1. $\frac{1}{2} \times \frac{50}{50} = \frac{50}{100} =$ 50%

2. $\frac{3}{10} \times \frac{10}{10} = \frac{\quad}{100} =$ %

3. $\frac{3}{5} \times \frac{20}{20} = \frac{60}{100} =$ %

4. $\frac{3}{4} \times \frac{25}{25} = \frac{\quad}{100} =$ %

5. $\frac{1}{4}$

6. $\frac{1}{25}$

7. $\frac{4}{25}$

8. $\frac{3}{10}$

9. $\frac{7}{20}$

10. $\frac{4}{5}$

11. $\frac{1}{5}$

12. $\frac{15}{25}$

13. $\frac{3}{5}$

14. $\frac{7}{10}$

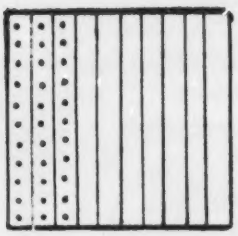
15. $\frac{8}{25}$

16. $\frac{11}{20}$

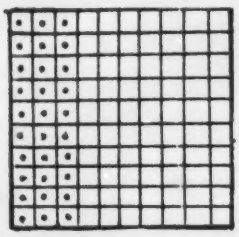
WRITE A PERCENT FOR EACH OF THE FRACTIONS:

FRACTION	FRACTION AS HUNDRETHS	PERCENT
$\frac{1}{2}$	$\frac{50}{100}$	50%
$\frac{2}{5}$		
$\frac{3}{20}$		
$\frac{3}{4}$		
$\frac{7}{10}$		
$\frac{13}{25}$		
$\frac{11}{20}$		
$\frac{2}{25}$		
$\frac{4}{5}$		
$\frac{6}{50}$		
$\frac{4}{10}$		
$\frac{3}{2}$		
$\frac{11}{10}$		
$\frac{9}{20}$		
$\frac{17}{25}$		

DECIMALS MEAN PART OF A TOTAL

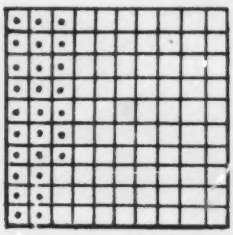


.3
means
3 out of 10



.30
means
30 out of 100

DECIMALS CAN ALSO BE WRITTEN AS PERCENTS



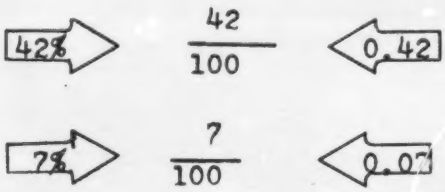
0.27 → $\frac{27}{100}$ ← 27%

WRITE EACH OF THE FOLLOWING AS A PERCENT:

1. 0.42 → $\frac{42}{100}$ ← 42%
2. 0.56
3. 0.23
4. 0.92
5. 0.15
6. 0.78
7. 0.06
8. 0.10
9. 0.89
10. 0.15
11. 0.01
12. 0.99
13. 0.54
14. 0.05

WRITE PERCENTS AS DECIMALS

Percents can be written as decimals if we write them as fractions first.



COMPLETE THE TABLE BELOW:

PERCENT	FRACTION	DECIMAL
23%	$\frac{23}{100}$	0.23
65%		
48%		
17%		

WRITE THE FOLLOWING PERCENTS AS DECIMALS:

1. 32%	2. 79%	3. 56%
4. 92%	5. 37%	6. 84%
7. 14%	8. 29%	9. 6%
10. 68%	11. 10%	12. 30%
13. 77%	14. 3%	15. 1%

WRITE A RATIO

3 out of 5 ⇨ $\frac{3}{5}$

RENAME THE RATIO IN HUNDREDTHS

$$\frac{3}{5} \times \frac{20}{20} = \frac{60}{100}$$

CHANGE THE FRACTION TO **PERCENT** **DECIMAL**

$\frac{60}{100}$ ⇨ 60% ⇨ 0.60

COMPLETE THE FOLLOWING TABLE:

	RATIO	FRACTION	FRACTION IN HUNDRETHS	PERCENT	DECIMAL
1.	7 out of 10	$\frac{7}{10}$	$\frac{70}{100}$	70%	0.70
2.	7 out of 25				
3.	18 out of 20				
4.	3 out of 4				
5.	42 out of 50				
6.	4 out of 5				
7.	17 out of 20				
8.	23 out of 25				
9.	2 out of 5				
10.	3 out of 10				
11.	30 out of 50				

USING RATIOS

Joe answered 18 out of 20 questions correctly.

18 out of 20 is the same ratio as 90 out of 100

$$\frac{18}{20} \times \frac{5}{5} = \frac{90}{100}$$

COMPLETE THE FOLLOWING:

1. 12 out of 20 = ____ out of 100 or _____%
2. 3 out of 5 = ____ out of 100 or _____%
3. 7 out of 10 = ____ out of 100 or _____%
4. 17 out of 25 = ____ out of 100 or _____%
5. 37 out of 50 = ____ out of 100 or _____%

FIND THE PERCENT FROM EACH OF THE FOLLOWING RATIOS:

1. Mike got 9 hits in 20 times at bat. What percent of hits?
2. Eight out of ten accidents are caused by carelessness. What percent of accidents are caused by carelessness?
3. Seven out of fifty apples in one crate were damaged. What percent of the apples were damaged?
4. About 4 out of 10 college students do not sell their text books. What percent do not sell their books?

SOME RATIOS ARE NOT WHOLE NUMBERS

$9\frac{1}{2}$ out of 25 = 38 out of 100

COMPLETE THE FOLLOWING:

1. $8\frac{1}{5}$ out of 20 = _____ out of 100
2. $3\frac{3}{10}$ out of 10 = _____ out of 100
3. $2\frac{1}{4}$ out of 5 = _____ out of 100

RATIOS AND HUNDRETHS

WHICH MAN HAD THE BEST SCORE IN A TRAPSHOOTING PRACTICE?

ANDY	MARK	JERRY
7 out of 10 hits	13 out of 20 hits	19 out of 25 hits
$\frac{7}{10} \overset{\times 10}{=} \frac{70}{100}$	$\frac{13}{20} \overset{\times 5}{=} \frac{65}{100}$	$\frac{19}{25} \overset{\times 4}{=} \frac{76}{100}$

CHANGING RATIOS TO HUNDRETHS ALLOWS US TO COMPARE

CHANGE EACH OF THE FOLLOWING RATIOS TO HUNDRETHS:

1. $\frac{1}{4} = \frac{\quad}{100}$
2. $\frac{2}{25} = \frac{\quad}{100}$
3. $\frac{11}{20} = \frac{\quad}{100}$
4. $\frac{4}{5} = \frac{\quad}{100}$
5. $\frac{7}{10} = \frac{\quad}{100}$
6. $\frac{17}{25} = \frac{\quad}{100}$
7. $\frac{3}{4} = \frac{\quad}{100}$
8. $\frac{19}{20} = \frac{\quad}{100}$
9. $\frac{9}{25} = \frac{\quad}{100}$
10. $\frac{6}{10} = \frac{\quad}{100}$

WE CAN CHECK A PROPORTION BY CROSS MULTIPLICATION

$\frac{9}{25} = \frac{n}{100}$ ⇨ $n \times 25 = 9 \times 100$

$25n = 900$ Divide both sides by 25:

$n = 36$

CHECK EACH OF THE TEN PROBLEMS ABOVE

SOLVING PROPORTIONS USING NUMBER SENTENCES OR EQUATIONS

Example: $\frac{\text{some number } n}{12} = \frac{4}{6}$

CROSS MULTIPLICATION GIVES:

$\frac{n}{12} = \frac{4}{6}$

n times 6 = 4 times 12

$6n = 48$ (divide both sides by 6)

$n = 8$

SOLVE:

1. $\frac{k}{14} = \frac{4}{8}$

$8k = 56$

$k = 7$

2. $\frac{4}{12} = \frac{2}{s}$

$4s = 24$

$s = ?$

3. $\frac{3}{5} = \frac{y}{15}$

$5y = ?$

$y = ?$

4. $\frac{9}{r} = \frac{3}{?}$

$3r = ?$

$r = ?$

SOLVE:

5. $\frac{x}{6} = \frac{5}{10}$

6. $\frac{n}{9} = \frac{4}{36}$

7. $\frac{7}{56} = \frac{n}{8}$

8. $\frac{4}{32} = \frac{32}{x}$

9. $\frac{6}{n} = \frac{18}{39}$

10. $\frac{x}{22} = \frac{6}{44}$

PERCENTS GREATER THAN 100%

A college lecture room holds 100 students. 128 students come to a special movie. There are 28 more students than the room will hold.

$$\frac{100}{100} + \frac{28}{100} = \frac{128}{100} \quad \text{or} \quad 128\%$$

EXAMPLES OF RATIO GREATER THAN ONE AND PERCENTS MORE THAN 100

$$\frac{6}{5} = \frac{120}{100} \text{ OR } 120\% \qquad 2\frac{1}{4} = \frac{9}{4} = \frac{\quad}{100} = \quad\%$$

COMPLETE:

1. $\frac{12}{5} = \frac{\quad}{100} = \quad\%$

2. $1\frac{1}{2} = \frac{\quad}{100} = \quad\%$

3. $\frac{63}{50} = \frac{\quad}{100} = \quad\%$

4. $1.75 = \frac{\quad}{100} = \quad\%$

5. $3.07 = \frac{\quad}{100} = \quad\%$

6. $4\frac{1}{5} = \frac{\quad}{100} = \quad\%$

WRITE EACH OF THE FOLLOWING AS A PERCENT:

7. $\frac{9}{5}$

8. $\frac{11}{4}$

9. 3.95

10. $\frac{7}{2}$

11. $\frac{19}{20}$

12. $2\frac{3}{50}$

13. 3.04

14. $\frac{27}{25}$

15. $\frac{7}{7}$

16. $\frac{13}{4}$

17. 7.48

18. $\frac{84}{50}$

19. $5\frac{1}{2}$

20. $\frac{37}{20}$

21. 2.06

PERCENTS LESS THAN 1%

> WHEN A PART OF SOMETHING IS VERY SMALL COMPARED TO THE TOTAL, THE PART MAY BE LESS THAN 1 OUT OF 100.

EXAMPLE:

IN A TOWN OF 2800 PEOPLE 14 WORK IN THE TOWN HALL.
WHAT PART OF 2800 IS 14?
WHAT PERCENT OF 2800 is 14?

$$\text{PART} \longrightarrow \frac{14}{\text{TOTAL} \longrightarrow 2800} = \frac{n}{100}$$

$$2800\,n = 1400$$

$$n = .5 \quad \text{OR} \quad \frac{1}{2} \text{ OF } 1\%$$

EXAMPLES OF RATIO THAT GIVE PERCENTS LESS THAN 1%

COMPLETE EACH OF THE FOLLOWING:

1. $\frac{63}{21000} = \frac{\quad}{100} = \quad\%$
2. $\frac{15}{7500} = \frac{\quad}{100} = \quad\%$
3. $\frac{7}{2080} = \frac{\quad}{100} = \quad\%$
4. $\frac{2.5}{625} = \frac{\quad}{100} = \quad\%$
5. $\frac{49}{7000} = \frac{\quad}{100} = \quad\%$
6. $\frac{6}{20000} = \frac{\quad}{100} = \quad\%$

PROPORTIONS

SOLVE 3 TYPES OF PERCENT PROBLEMS

$$\frac{\text{PART of a quantity}}{\text{TOTAL of the quantity}} = \frac{\text{PART of percent}}{\text{TOTAL or 100\%}}$$

TYPE 1

What percent of 5 is 3?

Percent not known

$$\frac{\text{Part} \rightarrow 3}{\text{Total} \rightarrow 5} = \frac{?}{100} \Rightarrow 5 \times ? = 3 \times 100$$

$$5n = 300$$

$$n = 60$$

Thus 3 is 60% of 5

TYPE 2

What number is 60% of 5?

Part not known

$$\frac{\text{Part} \rightarrow n}{\text{Total} \rightarrow 5} = \frac{60}{100} \Rightarrow 100 \times n = 5 \times 60$$

$$100n = 300$$

$$n = 3$$

TYPE 3

3 is 60% of what number?

Total not known

$$\frac{\text{Part} \rightarrow 3}{\text{Total} \rightarrow n} = \frac{60}{100} \Rightarrow 60 \times n = 3 \times 100$$

$$60n = 300$$

$$n = 5$$

TYPE I (PERCENT NOT KNOWN)

FIVE STATES IN THE UNITED STATES

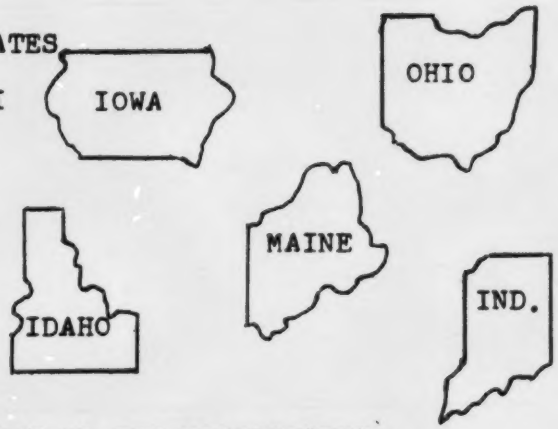
THREE EAST OF THE MISSISSIPPI

TWO WEST OF THE MISSISSIPPI

3 OUT OF 5

EAST OF THE MISSISSIPPI

$$\frac{3}{5} = \frac{60}{100}$$



60% OF THE FIVE STATES ARE EAST OF THE MISSISSIPPI

What percent of 4 is 3?

(What part of 4 is 3 OR 3 out of 4)

PART → $\frac{3}{4} = \frac{n}{100}$ ⇨ $4n = 300$ $n = 75$

TOTAL →

3 is 75% OF 4

WRITE A PROPORTION AND SOLVE EACH OF THE FOLLOWING:

1. What percent of 32 is 8?
2. What percent of 48 is 12?
3. Four is what part of 16?
4. What part of 24 is 6?
5. Nine is what percent of 10?
6. What percent of 25 is 5?
7. Six is what part of 20?
8. What percent of 36 is 9?
9. What part of 100 is 43?

PERCENT PROBLEMS

Write a proportion and solve each of the following:

1. Fifty people were on a bus.
   At the first stop 7 got off.
   What percent got off the bus?

2. Jane had 40 record albums.
   Thirty of the albums were
   country-western.
   What percent were country-
   western?

3. Larry worked 25 hours on his
   part time job. He spent 20 hours
   of the time talking to customers.
   What percent did he spend with customers?

4. The total cost of a new car was $3600.
   The down payment was to be $900.
   What percent was the down payment?

5. One sunny day 40 out of the 48 bike
   racks at the school were filled.
   What percent were filled?

6. Students selling tickets for a school
   organization made a profit of 40 cents
   on each $2.50 ticket. What part of
   the ticket cost was profit?

7. Rod bought 5 paper-back books. Four
   of the books were science-fiction.
   What percent were of that kind?

TYPE 2 (PART NOT KNOWN)

JANE'S JOB PAYS $182.50 EACH WEEK.

SHE SAVES 6% OF HER WEEKLY PAY.

HOW MUCH DOES SHE SAVE?

$$\frac{\text{PART} \longrightarrow}{\text{TOTAL} \longrightarrow} \quad \frac{n}{\$182.50} = \frac{6}{100}$$

THUS

$$100\,n = 6 \times \$182.50$$

$$100\,n = \$1095.00$$

$$n = \$10.95$$

WRITE A PROPORTION AND SOLVE EACH OF THE FOLLOWING:

1. 50% of 346 is what number?
2. 32% of 864 is what number?
3. What is 5% of 68?
4. 25% of 1084 is what number?
5. 125% of 1084 is what number?
6. 7% of 92 is what number?
7. What is 19% of 70?
8. What is $33\frac{1}{3}\%$ of 963 ?
9. What is 0.5% ($\frac{1}{2}$ of 1%) of 240?
10. 14% of $175 is what amount?
11. What would be a 10% down payment on $1000?
12. 22% tax on an income of $14,000 a year would be what amount of tax?

PERCENT PROBLEMS

Write a proportion and solve each of the following:

1. Nancy and Jim are buying a stove on sale. They are to get 15% off the price of $350. How much will they save?

2. In a manufacturing plant the manager estimates that 5% of the products produced might not pass inspection. If in one week 2468 items are produced, how many might not pass inspection?

3. It is estimated that 45% of the seniors that graduated from Fulton High School last year own a car. If 160 students graduated last year, how many own cars?

4. Joe got 80% on a test. If there were 75 questions on the test, how many did he get right?

5. If the sales tax in Iowa were changed to 4% instead of the present 3%, what would be the sales tax on an item selling for $12.79?

6. How much would you save on a $165 set of golf clubs if you were to get a 35% discount?

7. Martin Luckeguy invested $250 on a new invention. He made a profit of 115% the first year. How much did he make the first year?

8. In a chemical test 0.75% of a sample was copper. How much copper was in the sample if its total weight was 36 oz?

TYPE 3 (TOTAL NOT KNOWN)

A STAMP CLUB IS HAVING A MONTHLY MEETING.

FORTY EIGHT MEMBERS ARE PRESENT.

THAT IS 80% OF ALL THE MEMBERS.

HOW MANY PEOPLE ARE IN THE STAMP CLUB?

80% of what number is 48?

$$\begin{matrix}\text{PART} \longrightarrow \\ \text{TOTAL} \longrightarrow\end{matrix} \frac{48}{n} = \frac{80}{100}$$

$$80n = 4800$$

$$n = 60$$

WRITE A PROPORTION AND SOLVE EACH OF THE FOLLOWING:

1. 20% of what number is 65?
2. 29% of what number is 232?
3. 25% of what number is 68.5
4. 16% of what number is 5.76?
5. 41 is 5% of what number?
6. Find a number such that 12.5% of it is 26.25.
7. 60% of what number is 81?
8. 27 is 150% of what number?
9. 2 is 8% of a number. Find the number.
10. 65% of what number is 1300?
11. 20% of what number is 3?
12. 0.2% of what number is 8?
13. 15% of what number is 9?
14. Find a number such that 3% of it is 2.7.

PERCENT PROBLEMS

Write a proportion and solve each of the following:

1. A real estate salesman received $2415 for selling a house. His commission is 7% of the cost of the house. What did the house cost?

2. Last week 28 surgical cases were admitted to a mid-west hospital. This was 40% of the total number of patients admitted. How many patients were admitted?

3. Sam has 147 mystery books in his paper-back book collection. This is 70% of his total collection. How many books are in his collection?

4. Thirty-five percent of the families in Hilltop Mobile Park have dogs. There are 14 dogs as pets in the Mobile Park. How many families live there?

5. About 60% of the human body weight is water. About 72 pounds of water would be in what weight person?

6. A refrigerator is on sale for $376 and is advertised as being 12% off the regular price. What was its regular price?

7. How much money must you invest at 6% interest to have an income of $3000 each year?

8. Thirty-five of the members of the Sailing Club want to compete in an out of town event. This is only 46 $\frac{2}{3}$% of the total club membership. How many members does the club have?

ALL THREE TYPES OF PERCENT PROBLEMS

Read carefully then write a proportion and solve.

Type 1-Percent not known Type 2 -Part not known

Type 3 - Total not known

$$\frac{\text{PART}}{\text{TOTAL}} = \frac{\text{PART \%}}{\text{TOTAL 100\%}}$$

1. What percent of 15 is 3?
2. 75% of 84 is what number?
3. What percent of 32 is 28?
4. 80% of what number is 64?
5. 32% of 15 is what number?
6. What percent of 50 is 25?
7. 25% of 24 is what number?
8. What percent of 24 is 18?
9. 50% of what number is 10?
10. What percent of 12 is 8?
11. 50% of what number is 10?
12. What percent of 12 is 4?
13. 40% of what number is 160?
14. $33\frac{1}{3}$ % of 561 is what number?
15. What percent of 280 is 7?
16. What percent of 12 is 0.3?

Write a proportion and solve.

17. There are 12,000 people in Lake City. About 38% of them are under the age of 18. How many are under the age of 18?

    38% of 12,000 is what number?

18. There were 50 problems on the math test. John worked 46 of the problems correctly. What percent did he work correctly?

    What percent of 50 is 46?

19. Jane has read 60% of her text book. She has read 135 pages. How many pages are in the book?

    60% of what number is 135?

PERCENTS LESS THAN 1%

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EXAMPLE:

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WHAT PERCENT OF 2800 is 14?

$$\text{PART} \longrightarrow \frac{14}{\text{TOTAL} \longrightarrow 2800} = \frac{n}{100}$$

$$2800\,n = 1400$$

$$n = .5 \quad \text{OR} \quad \frac{1}{2} \text{ OF } 1\%$$

WRITE A PROPORTION AND SOLVE EACH OF THE FOLLOWING:

1. What percent of 5000 is 5?
2. Ten is .25% of what number?
3. What number if .3 of 1% of 9000?
4. What percent of 1000 is 7?
5. Two is what percent of 400?
6. Six is .1% of what number?
7. If only one-tenth of one percent of the chances in a recent lottery paid any money, how many of 8000 received any money?
8. The total budget of $287,874 was proposed by a small town. Office supplies made up $1439.37 of this amount. What percent of the total budget was for office supplies?

PROBLEM SOLVING WITH PERCENT

Write a proportion and solve each of the following:
(Additional problems may be found in Interest Areas booklets.)

1. The town of Harperville has 18,350 registered voters. In the last election 82% voted. How many voters voted?

2. One year the Forestry Department planted 7520 trees. Only 5640 of the trees survived. What percent of the total trees were lost?

3. The price of bread is 120% of the price a year ago. A loaf cost 45 cents a year ago. How much does the same loaf cost now?

4. Two cities together bought a large piece of land for a park. One city paid $370,320 which was 40% of the cost. What was the total cost of the land?

5. One season a hockey team scored a total of 160 points. 55% of the points were scored in the last half of games. How many points were scored in the last half of the games?

6. A salesman's commission on a $120 is $7.20. What is his rate of commission?

7. John and Charlotte had dinner in a local restaurant. The bill for the meal was $12.80 plus a 3% tax. How much was the tax?

8. If John (problem 7) wanted to leave a tip of about 15%, how much should he leave?

9. A station wagon that usually costs $5800 is marked down to $4,640. What is the percent of discount?

10. On a recent test one student had a score of $66\frac{2}{3}\%$. This represented 52 correct answers. How many questions were on the test?

Percent

1. 20%
2. 35%
3. 10%
4. 25%
5. 70%
6. 80%
7. 57%
8. 50%
9. 57%
10. 75%
11. 60%
12. 50%
13. 80%
14. 40%
15. 70%
16. 50%
17. 40%
18. 20%

1. 53%
2. 90%
3. 30%
4. 63%
5. 43%

Percent is Part of 100

1. $\frac{80}{100} = 80\%$
2. $\frac{65}{100} = 65\%$
3. 6%
4. 37%
5. 17%
6. 57%
7. 78%
8. 9%
9. 50%
10. 12%
11. 96%
12. 42%
13. 23%
14. 69%

1. $\frac{39}{100}$
2. $\frac{3}{100}$
3. $\frac{81}{100}$
4. $\frac{16}{100} = \frac{4}{25}$
5. $\frac{12}{100} = \frac{3}{25}$
6. $\frac{99}{100}$
7. $\frac{38}{100} = \frac{19}{50}$
8. $\frac{47}{100}$
9. $\frac{76}{100} = \frac{19}{25}$
10. $\frac{7}{100}$
11. $\frac{20}{100} = \frac{1}{5}$
12. $\frac{3}{100}$
13. $\frac{66}{100} = \frac{33}{50}$
14. $\frac{85}{100} = \frac{17}{20}$
15. $\frac{1}{100}$
16. $\frac{81}{100}$
17. $\frac{40}{100} = \frac{2}{5}$
18. $\frac{50}{100} = \frac{1}{2}$

1. 50%
2. 30%
3. 60%
4. 75%
5. 25%
6. 4%
7. 16%
8. 30%
9. 35%
10. 80%
11. 20%
12. 60%
13. 60%
14. 70%
15. 32%
16. 55%

1. $\frac{40}{100} = 40\%$
2. $\frac{15}{100} = 15\%$
3. $\frac{75}{100} = 75\%$
4. $\frac{70}{100} = 70\%$
5. $\frac{52}{100} = 52\%$
6. $\frac{55}{100} = 65\%$
7. $\frac{8}{100} = 8\%$
8. $\frac{80}{100} = 80\%$
9. $\frac{12}{100} = 12\%$
10. $\frac{40}{100} = 40\%$
11. $\frac{150}{100} = 150\%$
12. $\frac{110}{100} = 110\%$
13. $\frac{45}{100} = 45\%$
14. $\frac{68}{100} = 68\%$

Decimals Mean Part of a Total

1. 42%
2. 56%
3. 23%
4. 92%
5. 15%
6. 78%
7. 6%
8. 10%
9. 89%
10. 15%
11. 1%
12. 99%
13. 54%
14. 5%

Write Percents as Decimals

0.65, 0.48, 0.17

1. 0.32
2. 0.79
3. 0.56
4. 0.92
5. 0.37
6. 0.84
7. 0.14
8. 0.29
9. 0.06
10. 0.68
11. 0.10
12. 0.30
13. 0.77
14. 0.03
15. 0.01

2.	$\frac{7}{25}$	$\frac{28}{100}$	28%	0.28
3.	$\frac{18}{20}$	$\frac{90}{100}$	90%	0.90
4.	$\frac{3}{4}$	$\frac{75}{100}$	75%	0.75
5.	$\frac{42}{50}$	$\frac{84}{100}$	84%	0.84
6.	$\frac{4}{5}$	$\frac{80}{100}$	80%	0.80
7.	$\frac{17}{20}$	$\frac{85}{100}$	85%	0.85
8.	$\frac{23}{25}$	$\frac{92}{100}$	92%	0.92
9.	$\frac{2}{5}$	$\frac{40}{100}$	40%	0.40
10.	$\frac{3}{10}$	$\frac{30}{100}$	30%	0.30
11.	$\frac{30}{50}$	$\frac{60}{100}$	60%	0.60

Using Ratios

Part I
1. 60, 60%
2. 60, 60%
3. 70, 70%
4. 68, 68%
5. 74, 74%

Part II
1. $\frac{9}{20}$, 45%
2. 80%
3. $\frac{7}{50}$, 14%
4. 40%

Part III
1. 41
2. 33
3. 45

Ratios & Hundredths

1. 25
2. 55
3. 70
4. 75
5. 36
6. 8
7. 80
8. 68
9. 95
10. 60

Solving Proportions . . .

2. 6
3. 45, 9
4. 63, 21
5. 3
6. 1
7. 1
8. 256
9. 13
10. 3

Percents Greater than 100%

225, 225%
1. 240, 240%
2. 126, 126%
3. 307, 307%
4. 150, 150%
5. 175, 175%
6. 420, 420%
7. 180%
8. 275%
9. 395%
10. 350%
11. 95%
12. 206%
13. 304%
14. 108%
15. 100%
16. 325%
17. 748%
18. 168%
19. 550%
20. 185%
21. 206%

Percents Less than 1%

1. 0.3, 0.3%
2. $\doteq$ 0.337, 0.337%
3. 0.7, 0.7%
4. 0.2, 0.2%
5. 0.4, 0.4%
6. 0.03, 0.03%

Type I

1. 25%
2. 25%
3. 25%
4. 25%
5. 90%
6. 20%
7. 30%
8. 25%
9. 43%

Type I Percent Problems

1. 14%
2. 75%
3. 80%
4. 25%
5. $83\frac{1}{3}$ %
6. 16%
7. 80%

Type II

1. 173
2. 276.48
3. 3.4
4. 271
5. 1355
6. 6.44
7. 13.3
8. 321
9. 1.2
10. $24.50
11. $100
12. $3080

Type II Percent Problems

1. $52.50
2. 123.4 items
3. 72 car owner
4. 60 right
5. $.51
6. $57.75
7. $287.50
8. 0.27 oz.

Type III

1. 325
2. 800
3. 274
4. 36
5. 820
6. 210
7. 135
8. 18
9. 25
10. 2000
11. 15
12. 4000
13. 60
14. 90

Type III Percent Problems

1. $34,500
2. 70 patients
3. 210 books
4. 40 families
5. 120 lbs.
6. $427.27
7. $50,000
8. 75 members

All Three Types

1. 20%
2. 63
3. $87\frac{1}{2}$
4. 80
5. 4.8
6. 50%
7. 6
8. 75%
9. 20
10. $66\frac{2}{3}$ %
11. 20
12. $33\frac{1}{3}$%
13. 400
14. 187
15. 2.5%
16. 2.5%
17. 4,560 under 18
18. 92%
19. 225 pages

Percents Less than 1%

1. 0.1%
2. 4,000
3. 27
4. 0.7%
5. 0.5%
6. 6000
7. 8
8. 0.5%

Problem Solving With Percent

1. 15,047 voted
2. 25%
3. 54¢
4. $925,800
5. 88 pts.
6. 6%
7. $.38
8. $1.92
9. 20%
10. 78 questions

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